

Appendix B. References for Biomonitoring Analytical Methods

Dioxins, Furans, PCBs, Organochlorine Pesticides

Barr JB, Maggio VL, Barr DB, Turner WE, Sjodin A, Sandau CD, et al. New high-resolution mass spectrometric approach for the measurement of polychlorinated biphenyls and organochlorine pesticides in human serum. *J Chromatog B* 2003;794:137-48.

Patterson DG Jr., Alexander LR, Turner WE, Isaacs SG, Needham LL. The development and application of a high resolution mass spectrometry method for measuring polychlorinated dibenzo-p-dioxins and dibenzofurans in serum. In: Clement RE, Sui KM, Hill HH Jr., editors. *Instrumentation for trace organic monitoring*. Chelsea, MI: Lewis Publishers; 1990. p. 119-53.

Patterson DG Jr., Hampton L, Lapeza CR Jr., Belser WT, Green V, Alexander L, et al. High resolution gas chromatographic/high resolution mass spectrometric analysis of human serum on a whole weight and lipid basis for 2,3,7,8 TCDD. *Anal Chem* 1987;59:2000-5.

Turner WE, DiPietro E, Cash TP, McClure PC, Patterson DG Jr., Shirkan H. An improved SPE extraction and automated sample cleanup method for serum PCDDs, PCDFs, and coplanar PCBs. *Organohalogen Compounds* 1994;19:31-5.

Turner WE, DiPietro E, Lapeza CR, Jr., Green V, Gill J, Patterson DG Jr., et al. Universal automated cleanup system for the isotope-dilution high-resolution mass spectrometric analysis of PCDDs, PCDFs, coplanar PCBs, PCB congeners, and persistent pesticides from the same serum sample. *Organohalogen Compounds* 1997;31:26-31.

Metals

Caldwell KL, Hartel J, Jarrett J, Jones RL. Inductively coupled plasma mass spectrometry to measure multiple toxic elements in urine in NHANES 1999-2000. *Atomic Spectroscopy*. 2005;26(1):1-7.

Chen HP, Paschal DC, Miller DT, Morrow JC. Determination of total and inorganic mercury in whole blood by on-line digestion with flow injection. *Atomic Spectroscopy* 1998;19:176-9.

Miller, DT, Paschal DC, Gunter EW, Stroud PE, D'Angelo J. Determination of lead in blood using electrothermal atomization atomic absorption spectrometry with a L'vov platform and matrix modifier. *Analyst* 1987;112:1701-4.

Paschal DC, Ting BG, Morrow JC, Pirkle JL, Jackson RJ, Sampson EJ, et al. Trace metals in urine of United States residents: reference range concentrations. *Environ Res* 1998;76:53-9.

Stoeppeler M, Brandt K. Determination of cadmium in whole blood and urine by electrothermal atomic-absorption spectrophotometry. *Fresnies A Anal Chem* 1980;300:372-80.

Pesticide Metabolites

Bravo R, Caltabiano LM, Fernandez C, Smith KD, Gallegos M, Whitehead RD, et al. Quantification of phenolic metabolites of environmental chemicals in human urine using gas chromatography-tandem mass spectrometry and isotope dilution quantification. *J Chromatog B*. In press 2005. Available online: 26 April 2005, doi:10.1016/j.jchromb.2005.03.012.

Bravo R, Caltabiano LM, Weerasekera G, Whitehead RD, Fernandez C, Needham LL, et al. Measurement of dialkyl phosphate metabolites of organophosphorus pesticides in human urine using lyophilization with gas chromatography-tandem mass spectrometry and isotope dilution quantification. *J Expo Anal Environ Epidemiol* 2004;14:249-59.

Bravo R, Driskell WJ, Whitehead RD Jr, Needham LL, Barr DB. Quantitation of dialkyl phosphate metabolites of organophosphate pesticides in human urine using GC-MS-MS with isotopic internal standards. *J Anal Toxicol* 2002;26:245-52.

Hill RH Jr, Shealy DB, Head SL, Williams CC, Bailey SL, Gregg M, et al. Determination of pesticide metabolites in human urine using isotope dilution technique and tandem mass spectrometry. *J Anal Toxicol* 1995;19(5):323-9.

Olsson AO, Baker SE, Nguyen JV, Romanoff LC, Udunka SO, Walker RD, et al. A liquid chromatography-tandem mass spectrometry multiresidue method for quantification of specific metabolites of organophosphorus pesticides, synthetic pyrethroids, selected herbicides, and DEET in human urine. *Anal Chem* 2004;76(9):2453-61.

Polycyclic Aromatic Hydrocarbons

Smith CJ, Huang WL, Walcott CJ, Turner WE, Grainger J, Patterson DG Jr. Quantification of monohydroxy-PAH metabolites in urine by solid-phase extraction with isotope dilution GC-HRMS. *Analytical and Bioanalytical Chemistry* 2002;372:216-20.

Li Z, Romanoff LC, Young KJ, Blakely NC III, Wei RW, Needham LL, et al. Biomonitoring of human exposure to polycyclic aromatic hydrocarbons (PAH) and diesel exhaust by measurement of urinary biomarkers. *Epidemiology* 2004;15(4):S75.

Phthalate Metabolites

Blount BC, Milgram KE, Silva M, Malek N, Reidy J, Needham LL, et al. Quantitative detection of eight phthalate metabolites in human urine using HPLC-APCI-MS/MS. *Anal Chem* 2000;72:4127-34.

Silva MJ, Malek NA, Hodge CC, Reidy JA, Kato K, Barr DB, et al. Improved quantitative detection of 11 urinary phthalate metabolites in humans using liquid chromatography-atmospheric pressure chemical ionization tandem mass spectrometry. *J Chromatog B* 2003;789:393-404.

Silva MJ, Slakman AR, Reidy JA, Preau JLJ, Herbert AR, Samandar E, et al. Analysis of human urine for 15 phthalate metabolites using automated solid-phase extraction. *J Chromatog B* 2004;805:161-7.

Phytoestrogens

Valentin-Blasini L, Blount BC, Rogers HS, Needham LL. HPLC-MS/MS method for the measurement of seven phytoestrogens in human serum and urine. *J Expo Anal Environ Epidemiol* 2000;10:799-807.

Kuklenyik Z, Ye X, Reich JA, Needham LL, Calafat AM. Automated on-line and off-line solid phase extraction methods for measuring isoflavones and lignans in urine. *J Chromatogr Sci* 2004; 42:495-500.

Tobacco Smoke (Cotinine)

Bernert JT, Turner WE, Pirkle JL, Sosnoff CS, Akins JR, Waldrep MK, et al. Development and validation of a sensitive measurement of serum cotinine in both smokers and nonsmokers by liquid chromatography/atmospheric pressure ionization tandem mass spectrometry. *Clin Chem* 1997;43:2281-91.

Bernert JT, McGuffey JE, Morrison MA, Pirkle JL. Comparison of serum and salivary cotinine measurements by a sensitive high-performance liquid chromatography/tandem mass spectrometry method as an indicator of exposure to tobacco smoke among smokers and nonsmokers. *J Anal Toxicol* 2000;24:333-9.